Estimating Potency for Development of the Contaminant Candidate List (CCL)

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The 1996 Safe Drinking Water Act requires EPA to develop a list of contaminants with potential for regulation on a five-year cycle, and to make regulatory determinations from each list three years after its publication in the Federal Register. EPA requested assistance from the National Research Council (NRC) of the National Academy of Sciences (NAS) in providing suggestions for a comprehensive, transparent process of selecting contaminants for inclusion on the CCL. The NRC recommendations were published in 2001. They provided a framework for the process in which a Pre-CCL is initially selected from the universe of contaminants of concern. The CCL is chosen from the Pre-CCL using a computerized decision algorithm and scored attributes for health effects (potency, severity) and occurrence (prevalence, magnitude, persistence and mobility).

EPA has developed and tested an approach for scoring the non-cancer potencies of Pre-CCL chemicals using as input measured or modeled values for toxicity [e.g. reference dose (RfD), No-Observed-Adverse-Effect-Level (NOAEL), Lowest-Observed-Adverse-Effect-Level (LOAEL), LD_{50}]. The scoring was calibrated based on data from a learning set of about 200 chemicals found in drinking water. The distribution of the RfD, NOAEL, LOAEL, and LD_{50} values for the learning set chemicals was examined and found to be roughly log-normal. The log-based distribution was converted to a scale of 1 to 10 by equating a value of 5 on the scale to the central value in the distribution resulting in an equation that could be used to score each type of toxicity input. Scores were fairly consistent across related inputs for individual chemicals. Agreement across scores was weakest for chemicals with low toxicity such as minerals that are found in water and are also nutrients (e.g. calcium, iron).